

**Management Information System Project Management  
for the Coral Gables Fire-Rescue Department**

**Executive Planning**

**By:       Walter R. Reed  
          Coral Gables Fire-Rescue Department  
          Coral Gables, Florida**

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## **ABSTRACT**

The rapid increase of computers and computer-based technologies over the past two decades has generated a need for skilled, highly trained workers with the abilities to design and develop hardware and software systems. A problem exists when these technological advances out pace the human resources available within the fire-rescue department to address and implement needed changes in current management information systems. As with other fire departments across the nation, Coral Gables Fire-Rescue has been under financial mandates to do more with the same or less resources.

The purpose of this research project was to recommend a plan for the organization and management of the management information systems (MIS) for the Coral Gables Fire-Rescue Department. An evaluative research methodology was used to answer the following questions:

1. What is a management information system (MIS)?
2. What are some of the options available to address the organization and management of the Coral Gables Fire-Rescue Department's MIS needs?
3. What are some of the barriers that might impact the development and management of the fire department's management information system?
4. In the Miami-Dade County area, how do the other fire-rescue departments address their management information system support and service needs?
5. Is there a "one best way" to address the needs for support and service of a fire department's management information system?

The literature review found that there were many methods for organizing and managing the management information system needs for an organization. One of the solutions discussed in the literature review was to develop an in-house support and service group or division.

Another solution discussed was to "outsource" or assign responsibility for the management

information system to a city or county MIS department or private MIS company. Outsourcing can be accomplished by utilizing one of two methods. One method is to outsource the entire department's management information system to either a city or county MIS department. The second method would require the development of a joint or cooperative arrangement between the fire department and either the city or county MIS department or private MIS contractor.

A written survey (see Appendix A) was distributed to all six fire departments located in the Miami-Dade County area. The purpose of this survey was to determine who handles the management information system needs and support in these various departments and to what level does this service meet their needs. The study provided reinforcement to the theory that there is "no one best way" to organize and manage management information systems. In fact, as the literature review discussed, there are many methods for addressing current and new management information system needs.

The following recommendations were made for the organization and management of the Coral Gables Fire-Rescue Department's management information system.

- Establish an in-house MIS advisory committee comprised of those individuals on the department with a working knowledge of computer hardware and software.
- The fire department should retain management and control of the management information system and outsource the technical support and service for the department's system to a private contractor.
- The fire department should establish joint committees with other city departments and the other county fire-rescue departments to identify common software programs and data storage formats for information sharing.

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## INTRODUCTION

Technological changes in computer hardware and software are advancing at an astronomical rate. The rapid increase of computers and computer-based technologies over the past two decades has generated a need for skilled, highly trained workers with the abilities to design and develop hardware and software systems and to incorporate these advances into new or existing systems. This impacts all aspects of the business community, including the fire service. A problem exists when these technological advances out pace the human resources available within the fire-rescue department to address and implement needed changes in current management information systems.

The purpose of this research project is to outline a plan to effectively organize and manage the City of Coral Gables Fire-Rescue Department's emerging management information system needs. An evaluative research methodology will be used to answer the following questions:

1. What is a management information system (MIS)?
2. What are some of the options available to address the organization and management of the Coral Gables Fire-Rescue Department's MIS needs?
3. What are some of the barriers that might impact the development and management of the fire department's management information system?
4. In the Miami-Dade County area, how do the other fire-rescue departments address their management information system support and service needs?

5. Is there a “one best way” to address the needs for support and service of a fire department’s management information system?

## **BACKGROUND AND SIGNIFICANCE**

The National Fire Academy Executive Fire Officers’ program, Executive Planning course (1997, June) addresses the need for developing means and methods for strategic planning. In the city of Coral Gables, Florida there is no strategic plan for the development and implementation of a citywide management information system network. In fact, each department within the city is left to decide what types of computer hardware and software they wish to use. There is no continuity or “game plan” for the interaction between one department and another.

One of the serious consequences of this type of policy (or lack of a policy), is that vital public service departments, like police and fire, may not have the capability to share data and records with each other. The Coral Gables Fire-Rescue Department has attempted to develop a management information system that can and would bridge this potential gap between the two departments. In addition, the department is seeking out ways to network with the other fire-rescue departments located in the county. Unfortunately, the effort to develop this shared communications plan has only been recently realized.

As with other fire agencies across the nation, Coral Gables Fire-Rescue has been under financial mandates to do more with the same or less resources. These resources include not only

financial, but personnel. Due to freezes on hiring new personnel, many managers within the department have assumed more than one responsibility. For example, the Division Chief of Training has responsibility for the management and direction of firefighter training, emergency medical training, department support services, and direction of the management information system. The Training Division's staff includes four fire officers and three support personnel.

Coral Gables Fire-Rescue Department has three fire stations and a total of 38 computers located throughout the city. Station One, which serves as the headquarters for the department, has established a management information system network to serve 34 of the computers which are physically located within it. Stations Two and Three currently have no capability to network their computers into the department's management information system, located at Station One. This leaves approximately one-half of the personnel located at these remote stations without the ability to electronically share data, communicate schedules, access the internet and electronically mail (e-mail) to the fire department's headquarters. As a result, non-electronic communications are often slow, written correspondences occasionally get lost while being physically transported to headquarters, and incident and training reports must be downloaded to 3.5 inch disc and uploaded into the network server.

The significance of this problem is great. There currently exists a "service gap" between fire stations located throughout the city. In addition, there is no continuity between departments and agencies within the city and county. This has impacted the ability of the fire department to process and exchange information in an efficient and timely manner.

As discussed in the National Fire Academy's Executive Planning course (June 1997), there is a need to establish a strategic plan to address current and future needs for the department. Before this strategic plan can be developed, a project team needs to be assembled to provide the leadership and direction towards this goal.

## **LITERATURE REVIEW**

For this research project, a literary investigation was conducted utilizing the resources of the Learning Research Center at the National Fire Academy, various fire and emergency medical services journals, and Internet searches.

### **What is a management information system?**

Dock and Wetherbe (1988, pp. 85-86) define a management information system (MIS) as a "formal network using computers to provide management information for decision making. The goal of MIS is to get correct information to the appropriate manager at the right time, in a useful form."

Sprague (1980, p. 4) states that "in contrast to a data processing system, a management information system includes an information focus, aimed at middle managers; structured information flow; an integration of EDP (electronic data processing) jobs by business function, such as production MIS, marketing MIS, a personnel MIS, etc.; and inquiry and report generation, usually with data base."



## **Management Information Systems and the Fire Service**

Philip Schaenman (1988, page 165) states that “the computer has been described by some officers as the fourth major technological change to significantly improve fire protection, the other three being the internal combustion engine, the centrifugal pump, and the radio.” In making recommendations for the successful implementation of a management information system, Schaenman states that the management information system should address the following issues (pp. 165-166):

1. The data collected should have the ability to be analyzed and interpreted.
2. All personnel should be thoroughly trained in the “techniques” and use of the system.
3. Quality control measures should be adopted and implemented to ensure the quality of the data.
4. The data generated by the management information system should be compatible with federal, state, and local jurisdictions fire data systems.

In 1992, John D. Abbey discussed the changes facing public safety organizations with emerging management information system technology. According to Abbey (page 22):

Public safety agencies depend on information. The technologies to support, and enhance these vital services are undergoing dramatic change, emerging from the computer room and going to the street. A new focus on operational computing is driving new and innovative technologies from public safety professionals.

Another article (Beering, 1992) discussed the emergence and importance of computers in the fire service. Computer technology has now gone beyond the initial role of performing word processing applications to providing usable data bases, spreadsheets, scanning, imaging, digitizing, problem solving, and computer aided dispatching for the fire service.

Barry Furey (1995) states there will be many ways to deliver data and information to the fire

officer. This will range from global positioning systems to mobile data terminals. According to Furey, “data will be the most valuable commodity for the fire officer in the 21st century” (page 54).

Werner, Elliot, Webb, and White (1996, page 75) state that the Internet now has become a very important aspect of communication for the fire service. With access to the World Wide Web, fire departments now are connected to a variety of services and information. This includes the Federal Emergency Management Agency (FEMA), and the National Fire Academy (NFA), and the National Fire Protection Association (NFPA) to name just a few. Additionally, fire departments are now establishing home pages to network and share information with other departments on the net (page 75).

Harry R. Carter (1996) reviewed the rapid development of computer technology in the fire service. “The speed of computers is increasing so quickly that your new computer may be obsolete before you can get it out of the box” (page 38). Carter recommends seven courses of action that the fire service can take to address this dramatic change in management information (page 39):

- embrace computer technology
- change our basic attitudes (towards computers)
- provide training to the people
- provide facilities that use the latest training aids
- get on the virtual reality bandwagon
- play well in groups
- share what we have (information with other departments)

### **Restraints on the implementation of management information systems**

As discussed in the National Fire Academy’s course Strategic Management of Change (July 1996), often changes to the current way of doing business creates resistance to change.

Peter S. Beering (1992, page 52) states that:

The fire service has, however, been slow to embrace the many benefits which are offered by several of the application programs that are presently available. This is largely due to a fear of the unknown, and due to some in the computer industry who are “long on sales and short on service and support.”

Swain and White (1992, page 654) identified several “barriers to productivity.” They state that:

There are several barriers to productivity in implementing information technology. Some of these barriers include lack of computer literacy on the part of the end-users, lack of knowledge about functional applications on the part of system designers, hardware and software incompatibilities, and a reluctance to accept gains from technology.

McGowan and Spagnola (1992, page 637) assert that certain pitfalls should be avoided in the initial stages of implementing or updating a management information system. To maximize effectiveness at this initial stage, the pitfalls that should be avoided include:

- Losing sight of goals
- Relying too heavily on outside experts
- Integration of too many different management styles
- Not building consensus and alliances of the team right from the start
- Moving too fast on too many issues at one time
- Erratic communications
- Not protecting competitive advantages.

## **Methods for handling emerging management information system needs .**

### **In-house**

Several fire departments have addressed the increasing demands for new and improved management information systems by utilizing available resources in-house. Hank Christen (1990, page 93) addressed the question of how to “get started” or improve upon the existing management information system. In the article, Christen recommends establishing a project committee to explore the department’s needs, now and in the future. Additionally, the project committee should seek out outside resources available to help in defining this question. The committee should attend conferences, seminars, and network with other fire departments to determine how others address their emerging computer needs.

The National Fire Academy’s Executive Planning (July, 1997) course discussed the need for the establishing project teams to addressing major projects. In addition to providing representation and input for members of the department, these project teams generate more support from the other members of the department and provide for a sense of ownership. Additionally, team selection should be based on a combination of diverse “knowledge, skills, abilities, strengths, and perceptions” (United States Fire Administration, page SM 2-14).

Michael Moriarity (1995, page 49) discussed the importance of establishing an in-house MIS team before initiating or changing department information technology system. In the article, he recommends that the in-house team not be selected based upon their rank in the organization, since this has little to do with the ability of a person to understand the operations and complexities of a

management information system. Instead, selection should be based on those individuals who can and will contribute positively to the project. Finally, Moriarity identified several “sources of systems analysis training” that might benefit organizations and personnel involved in their organization’s management information systems (page 52). Among the sources identified:

- National Fire Academy’s Executive Planning Course
- University of California at Berkley’s correspondence course “Systems Analysis and Design”
- Nova University’s correspondence programs in computer based learning
- The International School of Information Management
- University of Phoenix Online

### **Outsourcing-What is it?**

As demand for increased technology has evolved over the past several years, small companies or public safety departments have been unable to properly staff to address the ever increasing demands of implementing and maintaining a management information system network. An alternative to having to staff a full time management information system manager or officer is to “outsource” or give responsibility for the management information system to a city, county, or state MIS department or private company. This may be done as a joint effort with the private company or city/county MIS department, or may involve turning responsibility for the management information system totally over.

John A. Granito (1995; page 80) discussed how many fire departments are going outside of their organizations to find assistance in dealing with emerging management information system technology. This ranges from helping to update master plans to assisting in the relocation of fire stations. Granito states (page 80):

Computers have changed the way we evaluate fire, rescue, and EMS services enormously. Consultants have always relied heavily on expert observations and opinions supported by available data, but sometimes it's difficult to support consulting analysis with realistic alternative strategies, given the countless variables that often are present. Fire departments often call on consultants to analyze station location or relocation issues, personnel deployment strategies, cost of services, and a host of other issues which would be almost impossible to understand and analyze without sophisticated computer programs.

In 1995, Michael Moriarity discussed the need to effectively manage information in the fire service. In his article, he points out that although the prices for computers have steadily declined over the years, the need for technical expertise has increased significantly. "Unfortunately, there is a worldwide shortage of planning expertise; and the fire service already fighting cutbacks, has been among the least likely to have the resources available to take maximum advantage of this new technology. This lack of planning has blunted the beneficial effects of computers on actual operations" (page 48). Moriarity recommends that prior to the actual purchase of new equipment or technology, that a systems analyst, either from within the organization or from outside the organization (outsourcing) be established and consulted.

Varun, Cheon, and Teng (1996, pp. 89-116) state that numerous organizations are moving toward the outsourcing of specific information management services in effort to maximize efficiency and effectiveness. The authors identified five component functions of information system outsourcing--

- applications development
- systems operations
- telecommunications
- end-user support
- and systems planning and management.

The research indicated that “the success of management information system outsourcing was highly related to the degree of outsourcing of two functions, systems operations and telecommunications. Also, both service quality of the vendor and elements of partnership such as trust, cooperation, and communication are important for outsourcing success” (pg. 89).

Peter Bendor-Samuel, President of Everest Software Corporation (Internet discussion, November 15, 1997), responded to an Internet request to identify the advantages and disadvantages of outsourcing. Among the advantages identified were reduced costs, variables fix the costs of support and service, reduced investment intensity, and an increase in focus on core competency. The disadvantages of outsourcing management information system identified by Bendor-Samuel included:

- the assumptions which the relationship was structured on change over time and the long term nature of the relationship cause problems in changing goals in mid-contract.
- inadequate preparation and lack of management result in loss of control of the relationship.
- suppliers sometimes exploit their sole source position to their advantage.
- lack of a continuous improvement structure fees cost when the learning curve and technology deflation should result in lower costs over time.

Bendor-Samuel also discussed the strategic and tactical reasons for outsourcing. Among the strategic reasons identified for outsourcing was access to technology, ability to focus on core competencies, and to utilize the outsourcer as a key source of value to share risk, investment, and lock in performance. Among the tactical reasons identified for outsourcing identified were short term cost reductions and it is a convenient method for effecting some form of technological transformation.

In 1992, Sidney W. Frost discussed the success Austin (Texas) Fire Department had

achieved in the implementation of their management information system. In this case study, the success of the department could be credited to “staff commitment, user involvement and workable change procedures essential for effectively managing computer projects” (page 39). Frost recommends that when working with a contracted MIS provider, that the department’s MIS coordinator take control of projects. By doing so, problems can be avoided before they occur. Frost discussed how all projects should include a project proposal and a time schedule for completion.

Additionally, the “project initiation agreement” should be developed with the following information (Frost, page 40):

- project name
- who requested the system
- start date
- planned completion date
- description of the project
- agreement to proceed with the project and authorized signature
- project completion and acceptance with authorized signatures.



## **PROCEDURES**

### **Population**

A written survey (see Appendix A) was distributed to all six of fire departments located in the Miami-Dade County area. Respondents consisted of executive fire officers from each of the jurisdictions located in this area. This written survey was used for compiling and correlating information on the management of each department's management information system.

### **Instrumentation**

A five question written survey instrument, entitled the "Survey of Computer Support Provided to Miami-Dade County Fire Departments" (see Appendix A), was distributed to all departments in Miami- Dade County area. Each department was identified on the survey by a letter A to F, to ensure anonymity, with the exception of Coral Gables Fire-Rescue Department who was identified by the letter A.

The purpose of this survey was to determine who handles the management information system needs and support in these various departments and to what level does this service meet their needs. Additionally, the survey attempted to determine the extent of influence each department had in the determination of who would provide this service.

All responses to the survey were tabulated and analyzed.

### **Assumptions and Limitations**

The first assumption made was that all respondents would be unbiased in their evaluation of their department's management information system support and service. All were instructed to put

personal feelings aside and to evaluate the support and service based on effectiveness and efficiency for the department.

The second assumption made was that those responding to the survey (all chief fire officers) had a working knowledge of the operations and management of a computer network. The ability to conceptualize the needs of the management information system and the support provided by the support/service provider could impact either positively or negatively the results of this survey.

The first limitation noted is that the population size was very small (six). Although small, it represented the total population of the survey area conducted, all the fire-rescue departments located in the Miami-Dade County area.

The second limitation of this survey was that not all management information systems are configured identically. There may be benefits or problems associated with the use of a specific type of system, that may lead to a positive or negative response on whether or not the department representative felt the support did or did not meet the department's needs.

## RESULTS

The survey results were used to answer the following questions:

**1. Who handles the management information system consultations and support for your department?**

Results from the survey indicated that there was a variety of methods being utilized. Two departments (A,B) in the Miami-Dade County area had designated in-house personnel to handle their management information systems. Two departments (C,D) had management information system departments provided by a city or county government department. Another department (F), had an in-house MIS support and service team that contracts with a private MIS company for additional support. The final department (E), had a city or county government MIS department that utilized an outside contractor to supplement their management information system and support computer needs.

**2. Do you feel the management information system support and staffing provided by or to your department meets your department's needs?**

Four of the six departments in the Miami-Dade area (C,D,E,F) responded that their current support structure met their department's needs. Two departments (A,B) indicated that the current method being employed by their department did not meet the needs of the department.

**2a. If the management information system does not meet the fire department's needs, what is the primary cause for this?**

When this question was answered by the two departments (A,B) who indicated that their department's needs were not being met, both indicated that a lack of personnel was the major contributing factor. Additionally, one department (B) felt that a lack of financial resources also contributed to the department's inability to address management information system needs.

**3. Does your department have any influence on who provides your computer or management information system support?**

When asked about this question about the type of influence each department had in the decision of who provided the management information system support, three departments (A,C,F) indicated that they had "total" control over the selection of the service provider. One department (E) could make recommendations that were not binding, and two departments (B,D) indicated that the department had no say in the decision of the management information system service provider.

**4. If given the opportunity to keep or change your computer or management information system support, would you?**

Four of the six area departments (C,D,E,F) indicated that if given the opportunity to keep or change their management information system service and support provider, they would remain with the same provider. Two of the responding departments (A,B), which included Coral Gables, indicated that they would change providers if given the opportunity. In fact, Coral Gables is currently exploring this option.

## DISCUSSION

The quantitative research findings for the fire-rescue departments located in the Miami-Dade County area indicates that those departments (C,D,E,F) with a city or county management information system department tended to be satisfied with the service and support provided. This included the one department that had a private support company working with the city/county management information system department, and another department that provided in-house MIS support supplemented by a contracted private support company. When these four departments were asked if they had the opportunity to keep or change their management information system provider, from the city/county MIS department or the private support company, all responded that they would not change the current support provider.

The two departments (A,B) that responded that the in-house MIS support they received did not meet the department's needs, stated they would change the current support provider. Both departments indicated that this lack of satisfaction with their current MIS support and service was a direct result of lack of staffing (personnel) to meet these needs.

The study and literature review confirmed that there is more than "one way" to effectively organize and direct the MIS activities. The study of the six fire departments located in the Miami-Dade county area provided reinforcement to the theory that there are many methods for addressing current and new management information system needs. The primary purpose for limiting the research population to the Miami-Dade county area was that these six departments are all members of the Dade County Chief Fire Officers Association. This association provides for the sharing of

information and joint training and educational efforts to all departments in the county area. If Coral Gables Fire-Rescue is to participate fully in the exchange of information, it needs to develop a MIS that is compatible with those other departments in the area.

As discovered in the study, when the management information system needs were handled in-house, dissatisfaction with the support and service provided was a result of lack of human resources. The Coral Gables Fire-Rescue Department currently has an in-house designated MIS administrator. Unfortunately, due to personnel restraints, there does not exist a full-time MIS administrator or support staff. There is however, funding available to outsource some of the management information needs.

## **RECOMMENDATIONS**

The purpose of this research project was to propose a plan to effectively organize and manage the City of Coral Gables Fire-Rescue Department's emerging management information system needs. The literature review and survey of other fire-rescue departments in the Miami-Dade County area helped identify the various means and methods the other Miami-Dade County fire-rescue departments use to address their current and future MIS problems.

One of the solutions discussed in the literature review was to develop an in-house support and service group. This option involved formally establishing a project management team with defined roles and responsibilities. If this option is exercised, fire department management must be

willing to fully support and commit to the needs of the MIS administrator and project team. This includes providing training opportunities for those delegated this responsibility. In addition, communications and networking with the other departments in the county area must be established to share and exchange information on current technology and common problems and issues.

Another solution discussed was to outsource the support and service of the management information system. One of the major advantages of outsourcing is that a city or county MIS department or private MIS company will have specialized training and expertise in the operation, design, and support of management information systems. A negative consequence may be the limited knowledge of fire department operations and procedures. Outsourcing of the fire department information systems can be accomplished by utilizing one of two methods. One method is to outsource the entire department's management information system to either a city or county MIS department. Under this plan, the fire department's control of its management information system would be relinquished to the city or county management information system department.

The second method would be the development of a joint or cooperative arrangement between the fire department and either the city/county MIS department or private contractor. Under this arrangement, the fire department would retain ownership and direction of the management information system by having an appointed MIS administrator and/or division established within the department.

The survey of the fire-rescue departments located in the Miami-Dade County area (n=6) provided some insight into the various means and methods the other departments utilize to address

their MIS needs and support. Support and service provided ranged from in-house to joint in-house with outsourcing support.

The city of Coral Gables Fire-Rescue Department's management information system support and service problems stem from the city's policy of non-intervention in MIS decisions. Additionally, the department has been under city mandates to freeze hiring. As a result of these two policies, the fire department has decided to explore its options to develop a management information system that will meet its needs. These needs include the ability to network with other city departments and other county fire-rescue departments.

The literature review discussed the importance of management information systems to the fire service and the various options available to address the growing MIS demands and needs. The literature review and the survey support the idea that there is "no one best way" to address the needs for support and service of a fire department management information system. All of the methods discussed in this research paper can and will address MIS needs given the support and commitment of the fire department management. This support includes, but is not limited to, financial, staffing, training, and hardware and software needs. Survey results from Miami-Dade County support this position.

In order to accomplish the department's management information system goals, this research project was undertaken to identify and recommend a course of action to the Fire Chief. The Executive Planning course provided the necessary foundation for the undertaking of such a project. As management information system administrator, in preparing this project and reviewing the



inadequacies of the current system, the following recommendations will be made to the Fire Chief for the management and administration of the department's management information system.

- Establish an in-house MIS committee comprised of those individuals on the department with a working knowledge of computer hardware and software. Membership of the committee should follow those recommendations outlined in the literature review.
- Since the city's policy allows for the independent development of management information systems for city departments, the fire department should outsource the technical support and service for the department's management information system to a private contractor. This recommendation is based on the realization that staffing a full-time MIS position or division within the department is not economically feasible at this current time. However, funding for management information system service and support is currently available in the existing budget.
- The fire department should establish joint committees with other city departments and the Dade County Chief Fire Officers Association to identify common software programs and data storage formats for information sharing.

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## APPENDIX A

### Survey of Computer Support Provided to Miami-Dade County Fire Departments (n=6)

**Note:** The six departments responding were labeled A through F, with Coral Gables Fire-Rescue Department being identified by the letter “A” and denoted by \*.

**1. Who handles the management information system consultations and support for your department?**

	IN-HOUSE DESIGNATED ONLY	IN-HOUSE WITH OUTSIDE SUPPORT COMPANY	CITY/COUNTY PROVIDED MIS	CITY/COUNTY MIS WITH OUTSIDE SUPPORT COMPANY	OUTSIDE SUPPORT COMPANY ONLY	NO ONE
DEPARTMENTS	A,B	F	C,D	E		
Total	*2	1	2	1	0	0

**2. Do you feel the management information system support and staffing provided by or to your department meets your department’s needs?**

	EXCEEDS	MEETS	DOESN'T MEET	DON'T KNOW
DEPARTMENT		C,D,E,F	A,B	
S	0	4	*2	0
Total				

**2a. If the management information system does not meet the fire department’s needs, what is the primary cause for this?**

**Department A:** There is a lack of available personnel to staff.  
**Department B:** Lack of “manpower” and money to have a full time person or division.

3. Does your department have any influence on who provides your computer or management information system support?

	TOTAL CONTROL	RECOMMEND ONLY	NO INFLUENCE
DEPARTMENT S	A,C,F	E	B,D
Total	*3	1	2

4. If given the opportunity to keep or change your computer or management information system support, would you?

	KEEP	CHANGE	DON'T KNOW OR UNDECIDED
DEPARTMENT S	C,D,E,F	A,B	
Total	4	*2	0